

## Case Report

# A rare case of sudden death due to thrombus from the internal iliac vein

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### Abstract

A 40-year-old healthy housewife died after joining a special summer camp for her diabetic daughter. The victim sat for 4 h 40 min while traveling by car on the day before her death. Autopsy revealed she died from a pulmonary thromboembolism (PTE), whereby portions of a blood-clot that had been formed in the internal iliac veins detached and traveled to the lungs, blocking the pulmonary blood flow. The leg veins are the most common source of thromboembolism; PTE caused by thromboemboli from the internal iliac veins is rare. We discuss the mechanisms of the present victim's death, and the conditions and risk factors involved in PTE.

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### 1. Introduction

Mortality rates from pulmonary thromboembolism (PTE) have recently increased significantly in Japan because of improvements in correct diagnoses of the disease and the Westernization of life style including diet in Japan.<sup>1</sup> Nevertheless, some differences in hereditary risks for PTE mean that the mortality rates are still lower in Japan than in Western countries.<sup>1</sup>

The common thrombi of PTE are those derived from the leg veins.<sup>2</sup> Pathologists who finds PTE at an autopsy would routinely search for thrombi in the leg veins. In some cases, however, veins apart from those in the lower limbs could be the cause of PTE. Some thromboemboli arise from the pelvic venous plexus and others from the right heart, moreover the upper extremities are source of thromboemboli, though an extremely rare source.<sup>3</sup> Searching for the source of thromboemboli is an important job for a pathologist, and can lead to the resolution of the conditions and risk factors for PTE.

### 2. Case report

A 40-year-old healthy housewife, while participating in a summer camp for child patients with diabetes, was found dead in her accommodation on a hot and humid summer day.

The victim had participated in lectures and prepared a meal in the afternoon after having driven by a car for 4 h 40 min on the day before her death. At a campfire at night, she told to her daughter and son that she had left chest and abdominal pains. Afterward she joined a party for the parents of child patients, leaving this party at about 00:30 h on the day of her death, and after bathing went to bed in one of the accommodation bedrooms. Her daughter found her body in a crouched position on her bed in the morning.

She had no past history of serious illness, operations including Caesarean section or hospitalizations for illness. She had used no drugs.

### 3. Autopsy examination

The deceased was a normally nourished female 168.5 cm tall and weighting 56.5 kg. No injuries were seen except for

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three needle marks on her chest and inguinal regions caused during attempted resuscitation.

Both lungs (right: 516 g, left: 454 g) were generally congested and mildly edematous. The main pulmonary arteries on each side were occluded by small to medium sized portions of beaded fresh blood-clot (Fig. 1). Additionally, there were pulmonary infarctions, two on the right lung and one on the left. These infarctions were associated with thrombus in the supply of medium sized vessels and in the distal vessels. The heart (272 g) was of normal size and dimensions, and showed no abnormalities of the myocardium or the valves. Although there were no thrombi in veins in both legs, there were several small sized fresh blood-clots in the right internal iliac vein (Fig. 2) and there was massive congestion of the broad ligament of the uterus.

Microscopically, many of the medium sized pulmonary arteries contained portions of fresh thrombus, some of them were completely occluding the vessel. Furthermore, there were some fresh thrombi in the vessels of the broad ligament of the uterus, though the uterus and the ovaries showed no abnormalities.

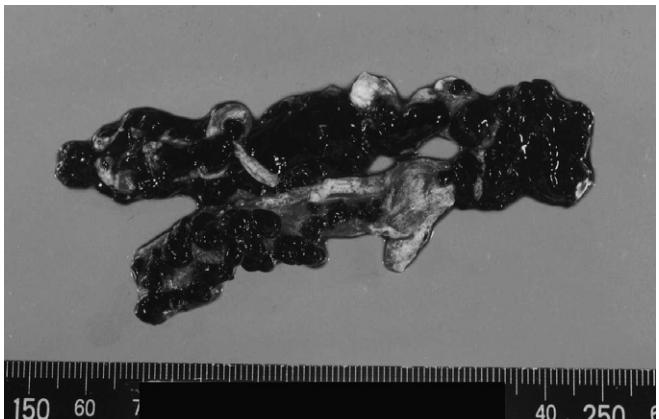


Fig. 1. Small and medium sized portions of fresh blood-clot in the main pulmonary arteries on each side.

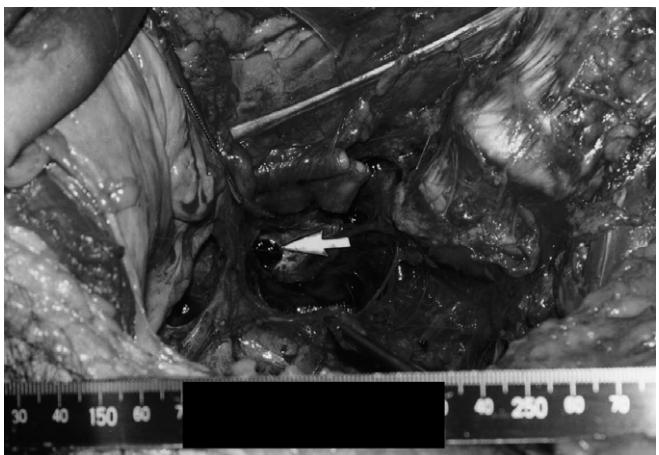


Fig. 2. Small sized portions of fresh blood-clot in the right internal iliac vein (white arrow).

#### 4. Discussion

The internal iliac veins are very rare sources of PTE. We noticed extensive congestion of the broad ligament of the uterus and were able to diagnose several thrombi in the right internal iliac vein as the source of PTE. Stern et al. reported in their study using magnetic resonance angiography (MRA) that the prevalence of pelvic deep vein thrombosis (DVT) in 24 patients with proven PTE and normal findings on lower limb compression duplex ultrasonography (CDUS) was 29%.<sup>4</sup> They also reported that the common iliac vein was the most frequently involved vein, and no patient had isolated internal iliac vein thrombosis.<sup>4</sup> Furthermore, they hypothesized that pelvic clots disclosed by MRA were not extensions of lower limb thrombosis but were indeed limited to pelvic veins, because all patients had normal findings on lower limb CDUS.<sup>4</sup> Their results and hypothesis are in complete accord with the evidence of this case; thus it is quite likely that a case of isolated internal iliac vein thrombosis is a rare event.

Some of the conditions and risk factors that favor the development of PTE are obesity, stasis (heart failure, chronic venous insufficiency), injury (trauma, surgery, parturition), hormonal imbalance (use of oral contraceptives), advanced age, immobilization (orthopedic, paralysis, prolonged bed rest, prolonged sitting such as in an airplane seat), and sickle cell disease.<sup>2,3,5</sup> Rarely, there are reports that venous aneurysm<sup>6</sup> and a uterine myoma<sup>7</sup> have caused a venous thrombosis in the pelvic veins. Considering these conditions and risk factors, prolonged sitting appeared to be the only predisposing factor. Hitosugi et al. reported a fatal PTE case of a middle age Japanese man after having driven for two and a half hours; suggesting that a thrombus can be formed due to immobilization even for a short time, although the victim had hypertension and atrial fibrillation.<sup>8</sup> In our present case, hot and humid climate is a factor that we believe cannot be ignored. Dehydration might result without enough fluid intakes on a hot and humid summer day. Such a dehydration can be added to one of the conditions that relate to the PTE development because it increases the viscosity of blood.<sup>9</sup> Furthermore, there is a possibility that the deceased secretly took oral contraceptives, though her family stated that she had denied habitual use of any kind of medicine. As oral contraceptives are known to increase the incidence of venous thromboembolism,<sup>10,11</sup> we cannot ignore the possibility that oral contraceptives affected the venous thrombosis in this case.

Massive pulmonary emboli typically cause a sudden obstruction of blood flow and sudden death.<sup>3</sup> This patient was presumed to have walked normally after getting off the car, but died about 12 h later. This is not a typical clinical course of PTE; however, the episode of chest and abdominal pains she had experienced the previous day, may agree well with having small earlier emboli. In this present case, many small portions of blood-clots that had formed in the internal iliac veins had detached and traveled to the lungs. They were gradually blocking the blood flow and

then causing pulmonary infarctions to progress little by little. The deceased might have endured the pain and so hesitated to consult a doctor because she did not want to disturb the summer camp for her daughter.

Pathologists should look for a thrombus in the case of the patient with PTE, not only in the leg veins but also taking care to examine the pelvic veins. While a search of the pelvic veins is not an easy task, massive congestion of distal tissues is a useful indication for undertaking this task.

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